Gustine, 24 August 1948, *Nobs & Smith 429;* Highway 33, 2.4 miles north of Dos Palos, 13 July 1949, *Nobs & Smith 965;* Mendota Pool, at entrance of Firebaugh canal, 10 August 1948, *Mason & Smith 8318;* Crane Ranch, south of junction of Merced and San Joaquin rivers, 11 August 1948, *Mason & Smith 8320;* Snelling highway, 2 miles northeast of Merced, 19 August 1948, *Mason & Smith 8366.*

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Literature Cited

Buchenau, Fr. 1889. Alismaceae. Engler and Prantl, Nat. Pflanzenf. 2(1): 227-232.

Durand, Th. 1888. Index generum phanerogamorum. xxii + 722 pp. Brussels.

Jepson, W. L. 1912. A flora of California. Volume 1. 578 pp. Cunningham, Curtiss & Welch, San Francisco.

Kunth, C. S. 1841. Enumeratio plantarum. Volume 3. 644 pp. Stutgart.

Micheli, M. 1881. Alismaceae. DeCandolle, Monographiae phanerogamarum 3:29–83.

Miquel, F. A. 1871. [1870–71]. Illustrations de la flore de l'archipel. indien. Volume 1, part 2. Amsterdam.

Morong, T. and J. G. Smith. 1894. Alismaceae *in* List of Pteridophyta and Spermatophyta growing without cultivation in northeastern North America. (Prepared by a committee of the Torrey Botanical Club) Mem. Torrey Club 5: 24–26.

Smith, J. G. 1895. A revision of the North American species of Sagittaria and Lophotocarpus. Rep. Mo. Bot. Gard. 6: 27–64. 29 pls.

————. 1899. Revision of the species of Lophotocarpus of the United States: and description of a new species of Sagittaria. Rep. Mo. Bot. Gard. 11: 145–152. 6 pls.

MR. PINCE'S MEXICAN PINE

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That's what Gordon (1858) called *Pinus Pinceana,* a rare Mexican pine of the pinyon group. It was originally discovered by M. Ghiesbreght "near the Hacienda del Potrees (?) in the ravine of Mestitlan [Barranca de Meztitlan?], State of Hidalgo." Ghiesbreght's specimen (no. 34) to which Gordon refers in his original description is in the Mexican collection at Paris, but has never been identified and named (Shaw, 1905). Martinez (1948) says that he could not verify this find-

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ing because of the deforestation of the area. Martinez also discredited Gordon's mentioning that this pine was collected by Mr. Charles Ehrenberg "upon a mountain . . . at a place called Cuernavaca [i.e., in the State of Morelos] at an elevation of from 8000 to 9000 feet." This may have been an error on Gordon's or on Ehrenberg's part.

Palmer collected this pine at Carneros (i.e. sheep) Pass in 1880. According to Shaw (1905) the cones of the pine somehow became placed together with the foliage of another pine, and the whole was duly described as *Pinus latisquama* Engelm. Later Pringle collected the pine at the same Carneros Pass and Shaw himself found a few trees at this locality in 1904, "about 2 miles NW of the station." The Carneros locality probably was visited by so many botanists because, being located on the main railroad line from Saltillo to San Luis Potosí, it was rather easy to reach in those days when roads were poor. Later, *P. Pinceana* was shown to occur in other localities of southeastern Coahuila (Johnston, 1943).

Martinez mentioned the occurrence of *Pinus Pinceana* in one locality in the State of Querétaro (Rancho de El Maguey Verde, near Camargo, *G. Aguilar*) and one locality, in Hidalgo (La Mesa, *Pringle 2293*). Martinez did not see the latter specimen.

The remaining eight localities listed by Martinez were all in eastern Coahuila, chiefly in different ranges of the Sierra Parras, which extends from east to west between the deserts of Coahuila and Zacatecas. Martinez does not think that *Pinus Pinceana* occurs in Zacatecas although there are, to quote Martinez (1948, p. 99) in "el Herbario de Washington ejemplares que se dice fueron collectados en el Pico de Teyra y en la Sierra de Zuloaga, Zac." To sum up, apparently *Pinus Pinceana* occurs in a few scattered localities of southeastern Coahuila, possibly in adjacent parts of Nuevo Leon, and perhaps (subject to verification) in Querétaro.

The writer had an opportunity to see this rare pine in the summer of 1950 in the State of Coahuila at Sierra del Garambullo near Hacienda del Garambullo (not far from the station El Fraile of the Coahuila and Zacatecas Railroad). Going from Saltillo to the Hacienda de Garambullo, the writer observed this pine on Carneros Pass and near El Fraile, and studied it more closely near the settlement of Garambullo at an elevation of 7,000 to 7,500 feet. All these three localities are listed in Martinez' book.

Near Garambullo, as well as in the two other localities, *Pinus Pinceana* (locally known as *pino blanco*, which may be interpreted as light, or sparse, foliage pine) grows in rocky gulches or draws where water may rush during the summer thunderstorms, but which are generally very dry. It is not "associated with *Pinus cembroides*" as Shaw (1914, p. 40)

U.S. Forest Service Photo

FIG. 1. Hacienda Garambullo, Coahuila. Pendant branches of *Pinus Pinceana* in left foreground.

suggests. The latter pine, which is called by the local people *pino prieto* (i.e. a pine with dark or dense foliage) does occur near Garambullo but it grows in small clusters on the rounded tops and on the upper slopes of the mountains, and was not observed in the draws.

Pinus Pinceana is not a bushy tree (cf. Shaw, 1914, p. 40), neither is it as tall as Gordon says. The trees observed were twenty to thirty feet high, rather crooked and distorted, with a rough grayish bark and shiny light brown cones about three inches long and one and one-half to two inches wide. Seeds are wingless, one-half inch long and three-eighths inch wide, and of a dark brown color. The seed shell is about one-sixteenth inch thick and very hard.

The trees have the appearance, as Gordon says, of a weeping willow although to the writer they looked from a distance more like the pepper tree *(Schinus molle)*. Their long and slender but not brittle branchlets are very different from most pine branchlets, and in their graceful beauty they have only one rival among the Mexican pines—the Lumholtz pine, commonly called *pino triste* or sad pine.

Pinus Pinceana grows in association with *Rhus* and *Cercocarpus* shrubs, barrel cactus, scrub oak and occasional tall yuccas whose leaves are closely clipped by hat-makers.

The foreman of the hacienda, who is an old man, told us that although he had twice sent foliage and cones to Mexico City, he did not remember any botanist having collected Pince's pine in the locality. Dr. Elbert L. Little Jr., Dendrologist of the United States Forest Service, wrote to the author that there are no pictures in botanical publications that would show *P. Pinceana* in its native habitat. Also, there are no pictures of this pine in the extensive photographic collection of the United States Forest Service. Hence, the photograph accompanying this article may be the first published picture showing this rare pine in its natural environment.

In conclusion, it may be appropriate to mention that the chemical composition of *Pinus Pinceana* turpentine (just determined by the author of this article) differs considerably from that of the turpentine of the *Pinus cembroides* complex, in that *Pinus Pinceana* turpentine consists largely of limonene with some carene and alpha-pinene, and an unknown sesquiterpene, while the pines of the *P. cembroides* complex possess turpentines consisting mostly of alpha-pinene with some limonene, and whose sesquiterpene fraction consists either of cadinene (in American pinyons) or of longifolene (in the Mexican pinyon). Thus, biochemically *Pinus Pinceana* is situated between the pinyons and the rest of the genus *Pinus*.

As Dr. Martinez showed diagrammatically in his book (1948, p. 87) *Pinus Pinceana* and perhaps *P. Nelsoni* may be considered as connecting links between the *Pinus cembroides* complex and the rest of the genus. This writer's study of the chemical composition of *Pinus Pinceana* turpentine supports this conclusion.

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Literature Cited

Gordon, George, and Robert Glendinning. 1858. The Pinetum. pp. 204-205. London

Johnston, Ivan M. 1943. Plants of Coahuila, Eastern Chihuahua and adjoining Zacatecas and Durango, I. Jour. Arnold Arboretum 24:306-339.

Martinez, Maximino. 1948. Los Pinos Mexicanos. Second Ed. 361 pp., illus. Mexico.

Shaw, George Russell. 1905. Pinus Pinceana. Gardeners Chron. Series 3, 38:122.

Shaw, George Russell. 1914. The genus Pinus. Publications of the Arnold Arboretum. No. 5. 96 pp., illus. Cambridge.